

--Abstract of the Disclosure

Insulating trenches isolate regions of a semiconductor layer and include hermetically sealed voids. After forming a trench, a first fill of SiO₂ is formed by a CVD process with the oxide layers having increasing thickness toward the upper trench edges forming first bottlenecks. The first fill oxide layers are then RIE etched to initially remove the oxide layer from the wafer surface with continued etching to remove the oxide layers in upper trench portions to define later sealing portions of the voids or to displace the first bottlenecks downward to define further bottlenecks. A second SiO₂ deposition is then performed using a low pressure CVD process to deposit oxide near steps formed previously and/or at the displaced bottlenecks to seal the voids. The deposition process is stopped when the sealed portions of the oxide layer above the voids are grown above the semiconductor wafer surface.--